## CLAIMS

What is claimed is:

1. A method of rate control between a first communication terminal and one or more remote communication terminals of a communication system, the method comprising:

receiving, at each of the one or more remote communication terminals, a respective signal modulated using a respective one of a plurality of rates from the first communication terminal via a respective forward channel, wherein each communication terminal is capable of supporting communications using the plurality of rates; and

determining a respective optimal one of the plurality of rates to be used by the first communication terminal for a respective subsequent signal to be transmitted to each of the one or more remote communication terminals based upon a respective maximization of the throughput to each of the one or more remote communication terminals given a respective channel state of each respective forward channel and a cost associated with a change in rate.

2. The method of Claim 1 wherein the determining step comprises:

determining, for each determining the respective optimal one step, respective cost functions corresponding to selecting each of the plurality of rates for the respective subsequent signal given the respective received signal using the respective one of the plurality of rates, each of the respective cost functions being a function of the throughput to a respective one of each of the one or more remote communication terminals and a cost associated with the change in rate; and

selecting, for each determining the respective optimal one step, a respective optimal cost function from the respective cost functions, the

respective optimal cost function providing the respective optimal one of the plurality of rates to be used by the first communication terminal for the respective subsequent signal to be transmitted by the first communication terminal.

3. The method of Claim 2 wherein the determining, for each of the determining the respective optimal one step, the respective cost functions step comprises:

determining, for each of the determining the respective optimal one step, respective cost functions associated with arriving at a system state using the respective one of the plurality of rates from previous system states using each of the plurality of rates, each of the respective cost functions being a function of the throughput to a respective one of each of the one or more remote communication terminals and the cost associated with the change in rate;

wherein the selecting, for each determining the respective optimal one step, the respective optimal cost function comprises:

selecting, for each determining the respective optimal one step, the respective optimal cost function from the respective cost functions, the respective optimal cost function providing an optimal one of the plurality of rates used in arriving to the system state using the respective one of the plurality of rates; and

equating the optimal one of the plurality of rates used in arriving to the system state to the respective optimal one of the plurality of rates to be used by the first communication terminal for the subsequent signal.

4. The method of Claim 2 further comprising solving, for each of the one or more remote communication terminals, the following equation to perform the determining, for each determining the respective optimal one step, the respective cost function step and the selecting, for each determining the respective optimal one step, the optimal cost function step:

$$V_n(s_n, r_n) = \max_{u \in \{1,2,\ldots,L\}} \left\{ R(s_n, r_n, u) + \beta V_{n-1}(s_n, u) \right\}$$

where $V_n(s_n, r_n)$ is the respective optimal cost function for the $n^{th}$ iteration, $s_n$ is a current channel state of the respective forward channel corresponding to the respective received signal, $r_n$ is the respective one of the plurality of $L$ rates that the respective received signal is modulated with, $u$ assumes any possible value of the plurality of L rates for the rate $r_{n+1}$, $r_{n+1}$ is the respective optimal one of the plurality of $L$ rates to be used by the first communication terminal for the respective subsequent signal, $\beta$ is a discount factor, $V_{n-1}(s_n, u)$ is the respective optimal cost function for iteration $n$-$1$, and $R(s_n, r_n, u)$ is a cost-per-stage function given by:

$$R(s_n, r_n, u) = \begin{cases} T(r_n, s_n) & \text{if} \quad u = r_n \\ C + T(u, s_n) & \text{if} \quad u \neq r_n \end{cases}$$

where $T(r_n, s_n)$ is the throughput to a respective one of the one or more remote communication terminals when rate $r_n$ is used for $r_{n+1}$ given channel state $s_n$, $T(u, s_n)$ is the throughput to the respective one of the one or more remote communication terminals when rate $u$ is used for $r_{n+1}$ given channel state $s_n$, and $C$ is the cost associated with the change in rate, where C<0.

5. The method of Claim 4 further comprising selecting the rate $r_{n+1}$ that satisfies the respective optimal cost function for each of the one or more remote communication terminals as the respective optimal one of the plurality of rates to be used by the first communication terminal for the respective subsequent signal, where $r_{n+1}$ is given by:

$$r_{n+1} = \arg\max_{u} \{R(s_n, r_n, u) + \beta V_{n-1}(s_n, u)\}.$$

6. The method of Claim 1 further comprising establishing the respective forward channel and a respective reverse channel between the first communication terminal and each of the one or more remote communication terminals.

7. The method of Claim 1 further comprising determining the respective channel state of the respective forward channel between the first communication terminal and each of the one or more remote communication terminals, the respective channel state based upon a respective measured signal-to-interference ratio corresponding to the respective received signal.

8. The method of Claim 1 further comprising transmitting a respective rate update message to the first communication terminal from each of the one or more remote communication terminals, each respective rate update message indicating the respective optimal one of the plurality of rates to be used by the first communication terminal for the respective subsequent signal.

9. The method of Claim 1 further comprising saving the respective optimal one of the plurality of rates to be used by the first communication terminal for the respective subsequent signal in memory.

10. The method of Claim 1 wherein the determining step is performed at each of the one or more remote communication terminals.

11. A rate control device for controlling the rate for communications from a first communication terminal to a second communication terminal of a communication system comprising:

a rate control module configured to perform the following steps:

obtaining a respective one of a plurality of rates corresponding to a signal received over a forward channel from the first communication terminal, the received signal having been modulated using the respective one of the plurality of rates, wherein each communication terminal is capable of supporting communications using the plurality of rates;

obtaining a channel state corresponding to the channel conditions of the forward channel for the signal received; and

determining an optimal one of the plurality of rates to be used by the first communication terminal for a subsequent signal to be transmitted to the second communication terminal based upon a maximization of the throughput to the second communication terminal given the channel state of the forward channel and a cost associated with a change in rate.

12. The device of Claim 11 further comprising an integrated circuit device, the rate control module implemented within the integrated circuit device.

13. The device of Claim 11 wherein the determining step to be performed by the rate control module comprises:

determining, for the determining the optimal one step, cost functions corresponding to selecting each of the plurality of rates for the subsequent signal given the received signal using the respective one of the

plurality of rates, each of the cost functions being a function of the throughput to the second communication terminal and a cost associated with the change in rate; and

selecting, for the determining the optimal one step, an optimal cost function from the cost functions, the optimal cost function providing the optimal one of the plurality of rates to be used by the first communication terminal for the subsequent signal to be transmitted by the first communication terminal.

14. The device of Claim 13 wherein the determining, for the determining the optimal one step, the cost functions step to be performed by the rate control module comprises:

determining, for the determining the optimal one step, cost functions associated with arriving at a system state using the respective one of the plurality of rates from previous system states using each of the plurality of rates, each of the cost functions being a function of the throughput to the second remote communication terminal and the cost associated with the change in rate; and

wherein the selecting, for the determining the optimal one step, the optimal cost function comprises:

selecting, for the determining the optimal one step, the optimal cost function from the cost functions, the optimal cost function providing an optimal one of the plurality of rates used in arriving to the system state using the respective one of the plurality of rates; and

equating the optimal one of the plurality of rates used in arriving to the system state to the optimal one of the plurality of rates to be used by the first communication terminal for the subsequent signal.

15. The device of Claim 13 wherein the rate control module is configured to perform the following additional step:

solving the following equation to perform the determining, for the determining the optimal one step, the cost function step and the selecting, for the determining the optimal one step, the optimal cost function step:

$$V_n(s_n, r_n) = \max_{u \in \{1,2,\ldots,L\}} \{R(s_n, r_n, u) + \beta V_{n-1}(s_n, u)\}$$

where $V_n(s_n, r_n)$ is the optimal cost function for the $n^{th}$ iteration, $s_n$ is a current channel state of the forward channel corresponding to the received signal, $r_n$ is the respective one of the plurality of $L$ rates that the received signal is modulated with, u assumes any possible value of the plurality of L rates for the rate $r_{n+1}$, $r_{n+1}$ is the optimal one of the plurality of $L$ rates to be used by the first communication terminal for the subsequent signal, $\beta$ is a discount factor, $V_{n-1}(s_n, u)$ is the optimal cost function for iteration $n$-1, and $R(s_n, r_n, u)$ is a cost-per-stage function given by:

$$R(s_n, r_n, u) = \begin{cases} T(r_n, s_n) & \text{if} \quad u = r_n \\ C + T(u, s_n) & \text{if} \quad u \neq r_n \end{cases}$$

where $T(r_n, s_n)$ is the throughput to the second communication terminal when rate $r_n$ is used for $r_{n+1}$ given channel state $s_n$, $T(u, s_n)$ is the throughput to the second communication terminal when rate $u$ is used for $r_{n+1}$ given channel state $s_n$, and $C$ is the cost associated with the change in rate, where C<0.

16. The device of Claim 15 wherein the rate control module is configured to perform the following additional step:

selecting the rate $r_{n+1}$ that satisfies the optimal cost function for the second communication terminal as the optimal one of the plurality of rates to be used by the first communication terminal for the subsequent signal, where $r_{n+1}$ is given by:

$$r_{n+1} = \arg\max_{u}\{R(s_n, r_n, u) + \beta V_{n-1}(s_n, u)\}.$$

17. The device of Claim 11 further comprising a state determination module coupled to the rate control module and configured to perform the following step:

determining the channel state of the forward channel between the first communication terminal and the second communication terminal, the channel state based upon a measured signal-to-interference ratio corresponding to the received signal.

18. The device of Claim 11 further comprising a receiver of the second communication terminal and configured to perform the following step:

receiving the received signal from the first communication terminal via the forward channel.

19. The device of Claim 11 further comprising a transmitter coupled to the rate control module and configured to perform, the following step:

transmitting a respective rate update message to the first communication terminal, the rate update message indicating the optimal one of the plurality of rates to be used by the first communication terminal for the subsequent signal.

20. The device of Claim 11 wherein the rate control module is located at the second communication terminal.

21. A method of rate control between a first communication terminal and a second communication terminal of a communication system, the method comprising:

obtaining a respective one of a plurality of rates corresponding to a signal received over a forward channel from the first communication terminal, the received signal having been modulated using the respective one of the plurality of rates, wherein each communication terminal is capable of supporting communications using the plurality of rates;

obtaining a channel state corresponding to the channel conditions of the forward channel for the signal received; and

determining an optimal one of the plurality of rates to be used by the first communication terminal for a subsequent signal to be transmitted to the second communication terminal based upon a maximization of the throughput to the second communication terminal given the channel state of the forward channel and a cost associated with a change in rate.

22. The method of Claim 21 further comprising receiving, at the second communication terminal, the signal having been modulated with the respective one of the plurality of rates from the first communication terminal via the forward channel.

23. A rate control system between a first communication terminal and a second communication terminal, the system comprising:

means for receiving, at each of the one or more remote communication terminals, a respective signal modulated using a respective one of a plurality of rates from the first communication terminal via a

respective forward channel, wherein each communication terminal is capable of supporting communications using the plurality of rates; and

means for determining a respective optimal one of the plurality of rates to be used by the first communication terminal for a respective subsequent signal to be transmitted to each of the one or more remote communication terminals based upon a respective maximization of the throughput to each of the one or more remote communication terminals given a respective channel state of each respective forward channel and a cost associated with a change in rate.